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# Accelerating the sustainable regeneration of urban districts



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A diversified, integrated  
and actor-based  
approach for the Kiel area  
of Antwerp

## *Abstract*

*Starting from the premise that strategies for building renovation or energy transition are only rarely applied in urban planning practice in Belgium, Björn Bracke and Daphné Roels use the example of the Kiel area of Antwerp to introduce the variety of building types and their links with social and ecological aspects. On the basis of these buildings' shared characteristics, the authors identify the renovation challenges and outline an integrated actor-based approach.*

## > Introduction

Energy consumption of buildings, taking into account the whole life cycle, is responsible for 40% of total EU energy consumption and for 36% of the EU's total CO<sub>2</sub> emissions<sup>1</sup>. New buildings only account for 1% to 1.5% of the overall building stock. Therefore the regeneration of the other 99% of the often outdated building stock poses a major challenge in order to meet the EU climate and energy targets<sup>2</sup>. The nature and the size of this challenge requires a strategy that transcends the renovation of singular buildings and a focus on urbanised areas with high concentrations of (old) buildings. Accelerating the current dynamics of building renovation is, however, a very complex challenge. Urban districts are a conglomerate of different building types,

functions and stakeholders, all responding to different trends, structures or logic, and therefore mobilising different instruments, institutions or legislation. Today, energy efficiency measures and policies are mainly the responsibility of federal and local governments that have rather generic instruments and incentives with a narrow focus on individual building renovation. However, renovation should be viewed as a unique opportunity for the sustainable regeneration of a whole district. Today, examples are still scarce for a more area-specific approach or the project-based allocation of resources. Furthermore, strategies for building renovation or energy transition, taken in a broad sense, are only rarely applied in urban planning practice in Belgium.

The lessons of the exploration in the Kiel area will be explained around three main ideas. The first section talks about the variety of building types and their interconnectedness with social and ecological aspects. On the basis of these shared characteristics, subsectors are identified with very different renovation challenges. Secondly, an actor-based approach

is explained, since actors have different capacity to intervene in the different stages of the lifecycle of a building. In the last section, an integrated approach to the renovation challenge is discussed. How is building renovation in the Kiel area interconnected with other important challenges?



*Fig1 - Bird's-eye view of the Kiel West project area, a multicultural district in the South of Antwerp with approximately 20,000 inhabitants*

### > A diversified approach

Renovation measures can only be successful if they are geared towards the needs, desires and motivations of the users of districts, including owners, tenants, city administrations, shopkeepers, youngsters, school teachers; etc. To understand these needs and to underpin a comprehensive renovation strategy, a classification into subsectors is a fundamental requirement. Subsectors are characterised by far-reaching similarities in building type, age, technical quality, ownership structure, profile of the residents, etc. These characteristics often have various roots in the past and can be explained by successive policy measures in different historical contexts. Such information helps to design tailor-made renovation strategies per subsector. The various distinct subsectors of the Kiel neighbourhood show the need for a diverse approach.

Kielpolder South is designed as a garden city and characterised by terraced single family dwellings with gardens. It was developed in the 1950s by the social housing company and sold to low-income groups. In the last decades,

the houses were gradually left by their original inhabitants. New inhabitants carried out small refurbishments, such as replacement of windows, roof insulation, or a replacement of the gas boiler. Renovation strategies in this subsector should take into account the architectural coherence of the sector and recent problems with flooding.

The Viennese district, named after similar building types in Austria, was built in the 1920-1940s, and is the oldest development in the neighbourhood. The buildings are all property of the social housing company and are rented to low-income groups. Since the 1980s, several refurbishments and energy efficiency measures have been implemented. Today, the social housing company plans to gradually replace these housing blocks by new buildings.

A mix of privately owned terraced houses is located in the centre of the Kiel neighbourhood. These houses were originally built in the 1950-1960s, and have since been subject to very different renovation stages. This results in a mishmash of very different building types and resident profiles.

The modernist building blocks of the famous Belgian architect Renaat Braem are the most remarkable buildings in the neighbourhood. The buildings are owned by the social housing company and were retrofitted in the early 1990s. The buildings are recognised as cultural heritage and subject to strict regulations. Like the Viennese district, the Braem building blocks are inhabited by often vulnerable

immigrant groups of North African and East European origin.

The last subsector consists of privately owned, terraced houses, simultaneously built in the 1960s. Most of the houses are still inhabited by the original residents, who have now reached the age of 70 and older.

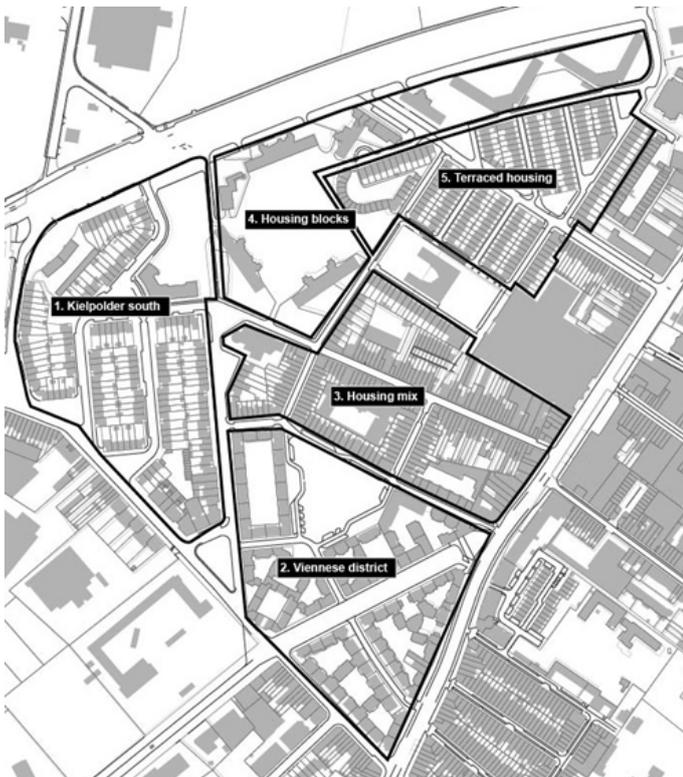


Fig2 - Subsectors in Kie West (GRB, 2016)



Fig3 - Different subsectors (photos by OMGEVING and Google Street View 29/01/2016): Kiepolder South (1st row left), Viennese district (1st row right), Terraced housing mix (2nd row left), Housing blocks by Braem (2nd row right) and 5. Terraced housing (3rd row)

### > An actor-based approach

Renovation strategies have to respond to existing processes of transformation. Stakeholders have a different capacity to influence the performance level of a building, depending on their needs, benefits and resources. Figure 4 shows the evolution of the performance level of a building during its total lifespan. With recurring investment patterns of 10, 25 and 50 years, buildings are - to very different extents - renovated to comply with the standards. The different levels of investment correspond with different types of measures, instruments and stakeholders. It is essential that the most is made of every refurbishment opportunity (i.e. moment of investment). Therefore renovation strategies

should take into account the life cycle of the building, apply the appropriate measures and mobilise the corresponding actors.

Small investments include maintenance works, calibration of the installation, training of the users or support. These measures are mainly the responsibility of the inhabitants, energy service companies, local governments and community workers. In the Kiel area, where many people from different cultural backgrounds live, this is a very important pillar. During interviews with several stakeholders, examples showed there is an inability among the residents to use their heating system (cover air ducts, open windows, wrong use of thermostats, etc).

Medium-sized investments are renovations that help to meet the current standards, but are no long-term solutions. Measures can be a new heating system, roof or wall insulation, window replacement, etc. These investments are done by the house owners, landlords or social housing companies and often supported by various renovation grants by the federal and local government. A large part of the individual house owners in the Kiel neighbourhood belongs to this category.

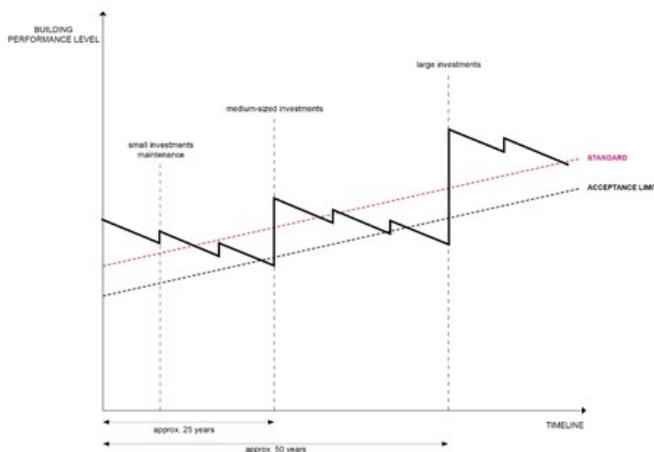


Fig4 - Technical life span of a building (own processing of Vijverberg, G., 2003; and Beheer, beleid en techniek, DW Corporate)

The larger investments are deep renovations or complete demolition. These larger investments are often too high for individual house owners and are mostly made by social housing companies, private developers or the autonomous development company of the city. In the Kiel area, the social housing company started to realise that medium-sized investments are not cost-effective and therefore now opts for larger investments.

### > An integral approach

The Kiel renovation strategy's overall goal is to cut back the yearly primary energy consumption in the neighbourhood by 60%. This includes the primary energy that is used for heating, hot water production, ventilation and cooling of the buildings. Although this seems to be a mere technical challenge, a (gradual) renewal of the building stock is part of an overall transformation process of

the urban district. Furthermore, there are many pathways or strategies to renew the current building stock that will influence social networks, local economy, housing affordability, biodiversity, etc. So, when defining renovation strategies, the objective should be to reduce the energy consumption of the buildings with maximum co-benefits. For the Kiel area, eight criteria were selected that are interconnected with building renovation: affordability; ownership; health; community; mobility; energy production; water; and biodiversity.

### > Affordability

Renovation of buildings requires financial resources. Energy efficiency measures are supported by the government via many different instruments and subsidies. Despite the proliferation of passive houses, solar panels and heat pumps in Flanders as a result of these incentives, far-reaching measures are rather rare in the Kiel area. This doesn't only raise the question whether these resources are equally allocated, but definitely shows that these measures fail to reach target groups in the Kiel area. A lack of know-how or start-up budget is often cited as an obstacle. Hence, many inhabitants can only do smaller renovations, such as renewal of the roof, replacement of the windows or installation of a new central heating boiler. As a result, a large part of the Kiel housing stock can hardly keep up with the increasingly strict building regulations, and a growing number of households is affected by 'fuel poverty'<sup>3</sup>.

### > Ownership

Home ownership is a key factor when talking about building renovation. Since individual ownership of buildings is historically strongly embedded in the Belgian culture, individual dwelling retrofitting takes a large part of the overall renewal policy in Belgium. However, in Kiel West, only 21% of the dwellings are inhabited by their owner<sup>4</sup>. Landlords are less inclined to invest in energy-efficiency measures that mainly benefit the tenants. Moreover,

recent trends show opportunities in a shift from 'product-based' towards 'service-based' business models. Energy service companies, gas boiler leasing or community land trust models are some examples that can address the mismatch between investor and consumer when thinking of renewal strategies.



Fig5 - Scheme of building renovation and its interrelated aspects (OMGEVING, 2016)

### > Health

People's wellbeing is indirectly related to building characteristics. The (lack of) comfort in housing units affects the physical and mental health of the residents. The World Health Organisation (WHO) estimated that 10-15% of the indoor environments where people live, work and play in Europe are damp, and humid buildings that can cause health problems, such as allergies and asthma<sup>5</sup>. As Europeans spend 90% of their time indoors, it is therefore important that energy renovations are done to support the healthy indoor climate of buildings<sup>6</sup>. Specific population groups - such as the elderly or children - benefit the most as they are more vulnerable mentally and physically. Studies show that the learning abilities of children can be improved by up to 15% when the indoor climate is improved<sup>7</sup>. The inability of many of the inhabitants of the Kiel area to change their living conditions

themselves is an additional source of stress<sup>8</sup>. Other issues with health implications in the Kiel area are illegal dumping, and noise and air pollution. There are more than 1,000 reports of illegal dumping per square km and per year in the Kiel neighbourhood. Due to the proximity of large infrastructure, 11% of the inhabitants are exposed to noise over 65dB<sup>9</sup>. Consequently, it is important to ensure that building renovations result in healthier buildings with adequate ventilation, natural daylight and a good quality indoor (and outdoor) climate to improve the wellbeing of the inhabitants with significant societal gains.

### > Community

Building renovation projects can have large impacts on local communities. Previous examples of deep renovations by the social housing company in Antwerp show that many of the original residents do not return after the completion of construction works. Renewal projects are often seen as a recipe for organising a general upgrade of the district, resulting in higher rents and housing prices that are unaffordable for the original inhabitants. Community impact is also closely related to the specific changes in the mix of housing types or the integration of other functions, such as stores or meeting places, when renovating or reconstructing buildings. In the Kiel area, there are high concentrations of similar unit types and a lack of quality spaces for recreation, meetings or the local economy. Renovation strategies can also encourage social interaction by including local and social economy initiatives, technical schools or group purchases. By involving the whole community in the building renewals, by keeping them updated on the transitions, by getting them to work and think together, renovation strategies can empower the local communities.

### > Mobility

The accessibility of public services is important for the neighbourhood, such as the proximity of the school, food stores, sport facilities, medical care, etc. Renewal of the buildings can coincide with district restructuring in order to improve public transport and/or to make it more user-friendly for cyclists and pedestrians. Higher densities nearby public transport stops, redesigning the street profile, reorganising parking areas, including bicycle parking, are possible co-benefits to improve accessibility and safety, and to promote sustainable modes of transport.

### > Energy production

Despite the focus on energy efficiency in the Kiel case study, every opportunity should be taken to include renewable energy sources. Renewable energy measures, such as solar panels, solar boilers, heat pumps, wind mills, etc, can be deployed on an individual, collective or even district level. A holistic approach incorporating both energy efficiency measures and renewable energy strategies is necessary to identify synergies or trade-offs between a simultaneous deployment. In the Kiel area, for example, the use of the residual heat of an adjacent industrial site can be a more cost-effective solution than an expensive refurbishment of the Braem building blocks, which are subject to strict heritage regulations.

### > Biodiversity and water

A regeneration of the building stock is a genuine chance to improve the richness in plant species and wildlife in the district. By increasing the quantity, quality, diversity and continuity of vegetation, green structures that accommodate wildlife can be adopted in the neighbourhood. Furthermore, vegetation has substantial capacity to both absorb and delay rainfall runoff, reduce the volume of rainfall runoff and reduce pollutants in water. For example, green roofs not only have a strong regulating effect on the temperature of

building interiors, they also provide important stepping stones in green networks, reduce the urban heat island effect and delay storm water runoff.

### > Conclusions

Energy efficiency measures represent a unique opportunity to regenerate the housing stock into a more sustainable, healthy and customised living environment. Due to a lack of understanding of how renovation processes work on a district level, today's policy fails to benefit fully from these opportunities. Based on the experiences of an area-based approach in the Kiel neighbourhood, we argue that sustainable regeneration must take into account three important considerations. The first idea comprises the recognition of building ensembles and corresponding characteristics. The second argues for an understanding of the life span of buildings, the different investment cycles and the importance of mobilising the right stakeholder at the right time. The last includes the interconnectedness of renovation strategies and the impacts, synergies and trade-offs with other fields. These observations will be the starting point of a multi-stakeholder process on district renovation in the Kiel area.

## End notes

1. ec.europa.eu; 17/02/2016
2. In the 2030 framework for climate and energy, EU countries have agreed to reduce greenhouse gas emissions by 40% compared to 1990 levels and achieve at least 27% energy savings compared with the business-as-usual scenario.
3. The condition of being unable to afford to keep one's home adequately heated.
4. Algemene directie statistiek, Census 2011
5. WHO, Damp and Mould: Health risks, prevention and remedial actions, 2009
6. BUILDINGS PERFORMANCE INSTITUTE EUROPE (BPIE), Renovation strategies of selected EU countries 2014, 2014
7. PACIFIC GAS AND ELECTRIC COMPANY, Daylighting in Schools: An Investigation into the Relationship between Daylighting and Human Performance (condensed report), August 20 1999
8. CEESE (ULB) & OASES, (UA) Energiearmoede in België: finaal rapport, December 2011
9. <https://stadincijfers.antwerpen.be>; 15/02/2016

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